

CLAIMS

1. A back-illuminated image sensor, comprising:
 - a converting portion for converting an incident beam into signal charges, the converting portion being provided on an incident face side on which the incident beam is irradiated, and the converting portion being provided for each of a plurality of pixels arranged in two dimensions;
 - a charge collecting portion for collecting the signal charges generated in the converting portion, the charge collecting portion extending from the converting portion to a surface side opposite to the incident face side;
 - a charge processing portion for processing the signal charges collected by the charge collecting portions, the charge processing portion being provided on the surface side; and
 - a suppressing region for suppressing a flow of the signal charges from the converting portion into the charge processing portion, the suppressing region being arranged between the converting portion and the charge processing portion.
2. A back-illuminated image, wherein the converting portion, charge collecting portion, charge processing portion, and suppressing region are made of semiconductor materials,

wherein the converting portion has a first conductivity type,

wherein the charge collecting portion has a second conductivity type, and

wherein the suppressing region comprises a charge blocking layer having the first conductivity type, an impurity concentration of the charge blocking layer being higher than that of the converting portion, the charge processing portion being embedded in the charge blocking layer, and the charge collecting portion penetrating through the charge blocking layer.

3. A back-illuminated image sensor, wherein the suppressing region further comprises a charge collecting layer having the second conductivity type, disposed between the converting portion and the charge blocking layer, and connected to an end portion at the incident face side of the charge collecting portion.

4. A back-illuminated image sensor according to any one of claims 1 to 3, wherein the charge processing portion is an A/D converter for converting analog signals into digital signals.

5. A back-illuminated image sensor according to any one

of claims 1 to 3, wherein the charge processing portion is a signal charge storage portion for storing the signal charges provided inside or in the vicinity of each pixel.

6. A back-illuminated image sensor according to any one of claims 1 to 5, wherein the incident beam is a light beam, and

wherein the image sensor further comprising an optical filter for blocking light having such wavelengths as that the light is transmitted from the incident side into the charge processing portion to cause generation of charges similar to the signal charges in the charge processing portion.

7. An electron microscope provide with the back-illuminated image sensor according to any one of claims 1 to 6.

8. An image capturing apparatus provided with the back-illuminated image sensor according to any one of claims 1 to 6.